

AUTOGENOUS TOOTH TRANSPLANTATION: A CASE REPORT

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ABSTRACT

Autogenous tooth transplantation or autotransplantation is a viable option for tooth replacement. The tooth indication to transplantation depends on the development of its root that should have growth up to 2/3 in addition to an open apex. This condition allows the replacement of lost teeth in children and young people that commonly has involved mandibular first molars, because of caries, and anterior teeth, because of trauma. This study presents a clinical case of autotransplantation of a 10-year-old child, which had the root of his maxillary left central incisor fractured in an accident. The proposed procedure involved transplantation of newly erupted mandibular right second premolar into the extraction socket. The literature review showed that the case was well indicated to achieve the success. The concept of atraumatic extraction was applied, avoiding disruption of the root sheath, with minimal extra-socket time. This report revealed the successful transplantation of a mandibular premolar into a socket of a maxillary central incisor. At five years follow-up, the tooth was found asymptomatic and functioning.

Keywords: autogenous tooth transplantation, dental trauma, oral surgery.

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INTRODUCTION

Autogenous tooth transplantation is the surgical movement of a tooth from its original site to another, replacing a lost or compromised tooth, in the same individual. This is a fast way to recover function and aesthetics properties [3, 12].

The best moment to indicate a tooth as a transplant is when the root development reaches a half or two thirds of its total length with a wide open apex. To the same purpose, a dental germ must reach one third of root development at least to allow stability into the new socket [1]. The mesiodistal dimension of the transplant should be the same or smaller than the original tooth besides a favorable position to be extracted without any lesion. It is very important the absence of periodontal disease or acute infection into the socket receiver [4, 13].

This kind of treatment is a unique option for young people because the alveolar bone has not completed the growth, which means that neither implant nor fixed prosthesis could be planned to these cases [1]. Thus, the transplant major advantage is the maintenance of the periodontal structures that make possible the normal alveolar bone development at that site allowing aesthetics restoration procedures [1, 7].

To the success achievement it is indispensable that patient enjoy as general as oral good health. It is also necessary the agreement in following the post operative instructions, like a careful oral hygiene and regular visits to follow up the case [4].

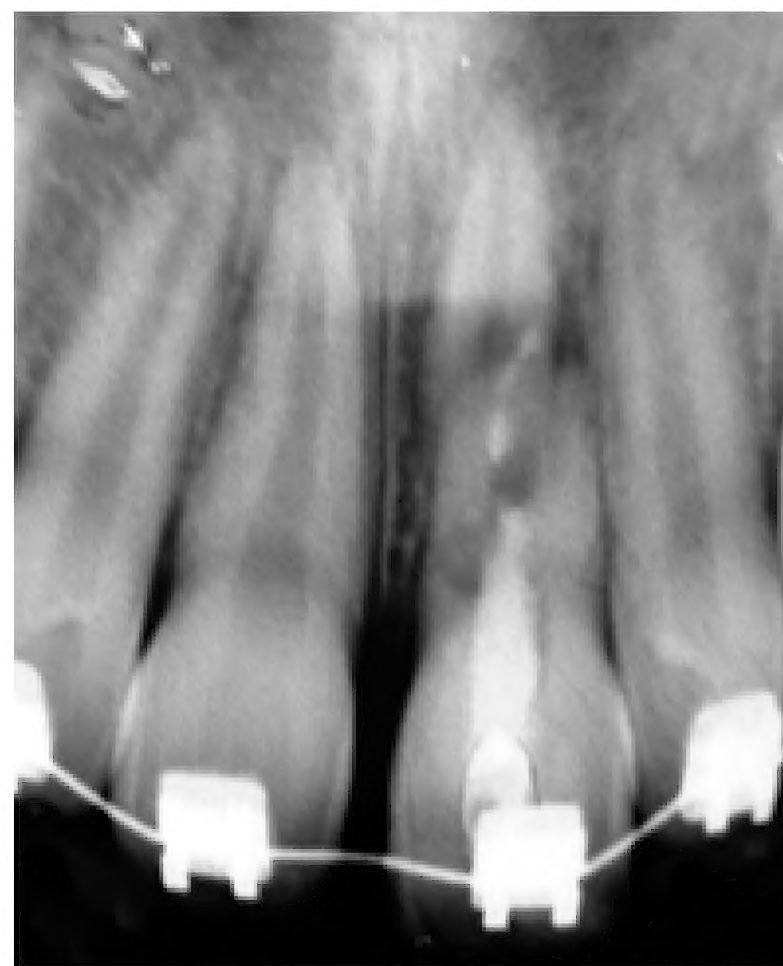
This case report describes an immediate autogenous transplantation from the mandibular right second premolar (#45) to replace the maxillary left central incisor (#21) extracted due to root fracture.

CASE REPORT

A 10-year-old Caucasian male came to the Endodontics Department of Santos Dumont Dental Clinic at Brazilian Air Force (Rio de Janeiro, RJ, Brazil) to treat the #21 tooth, which has the root fractured around two months earlier, caused by a bicycle accident. He was already being submitted to orthodontic treatment.

The radiographic examination showed a mid-root-fractured #21 tooth (Fig. 1). The surgeon examined the patient and suggested that the autogenous tooth transplantation would be the best treatment to the immediate replacement of this compromised tooth while the premolars extraction has been indicated at the orthodontic plan. The radiographic evaluation pointed out the #45 tooth as the best choice at that moment due to the ideal root development stage it was (Fig. 2).

The boy's parents agreed with this kind of treatment after understanding the appropriated orientations the surgeon gave them.

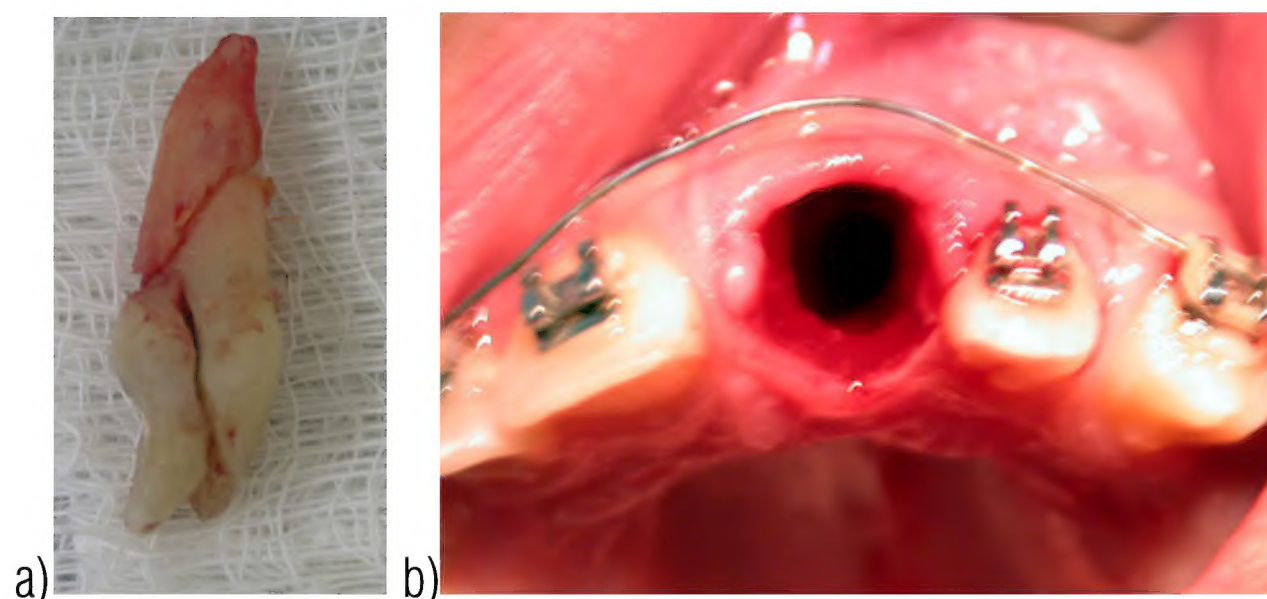


■ **Figure 1** – Preoperative radiograph showing fracture on the middle third of the root.



■ **Figure 2** – #45 tooth radiograph showing 2/3 of root development in addition a wide open apex.

First of all, the surgeon proceeded the extraction of #21 tooth carefully, removing the crown and part of the root with #69 extracting forceps (Quinelato®/São Paulo – Brazil) avoiding touch the socket walls and the gingival tissue around. The residual part of the root was removed by 301W Seldin elevator (Hu-Friedy®/Chicago – USA) (Fig. 3). The socket was irrigated with saline solution to moisturize. After that, the #45 tooth was removed with #151 extracting forceps (Quinelato®), positioned only at the crown, and immediately replaced at the empty socket.



■ **Figure 3** – a) # 21 tooth removed; b) receiver socket.

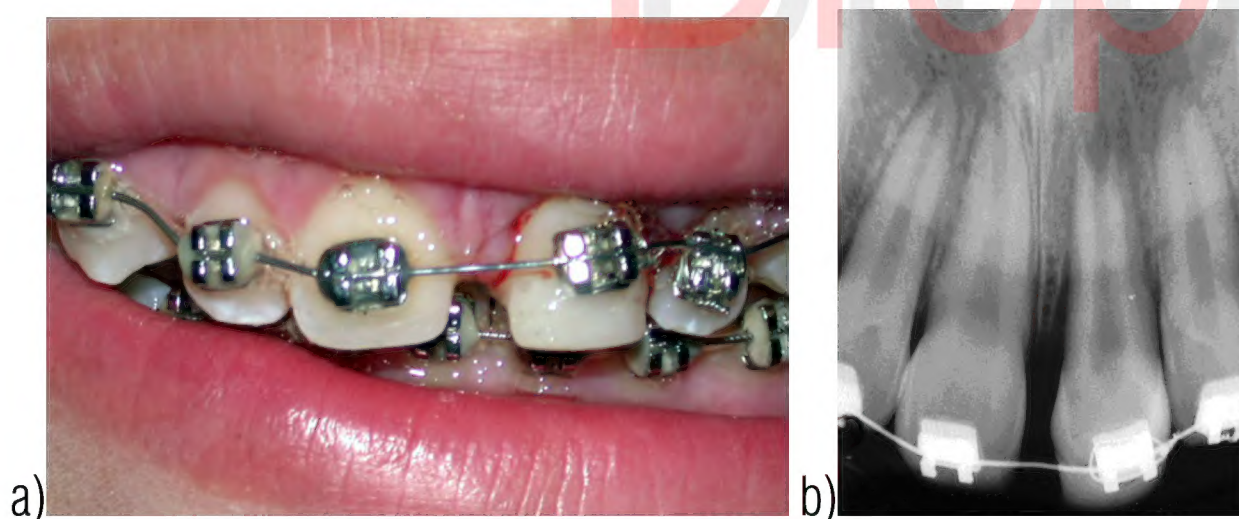
The morphology adjustment was done slightly using 3118 F (KG Sorensen®/ São Paulo – Brazil) diamond bur with copious irrigation to put it out of occlusion (Fig. 4). It was also built mesial and distal angles with composite resin (Fig. 5a). The orthodontic bracket was bonded onto the buccal surface of transplant and the stainless steel wire replaced as a splint. Orthodontic treatment was recommended to continue after 4 months from the procedure.

Antibiotics and anti-inflammatory were prescribed. A liquid diet and mouthwashes with chlorhexidine were recommended for the first two weeks as an adjunct of oral hygiene.

The postoperative radiograph revealed the good adaptation of transplant at the new site (Fig. 5b).

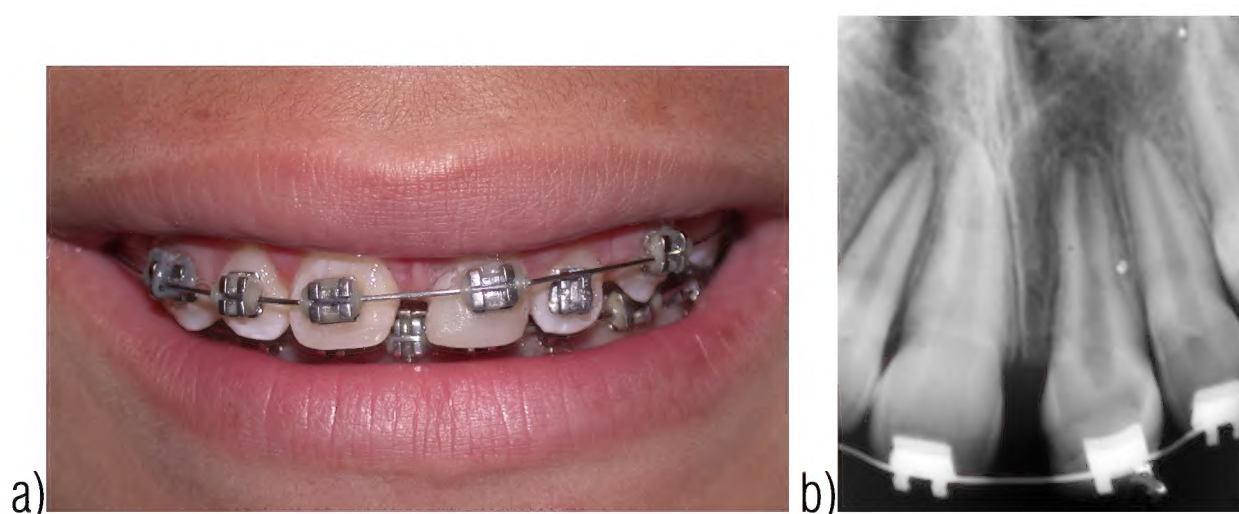


■ **Figure 4** – # 45 tooth transplanted and morphologically adjusted on palatal surface.



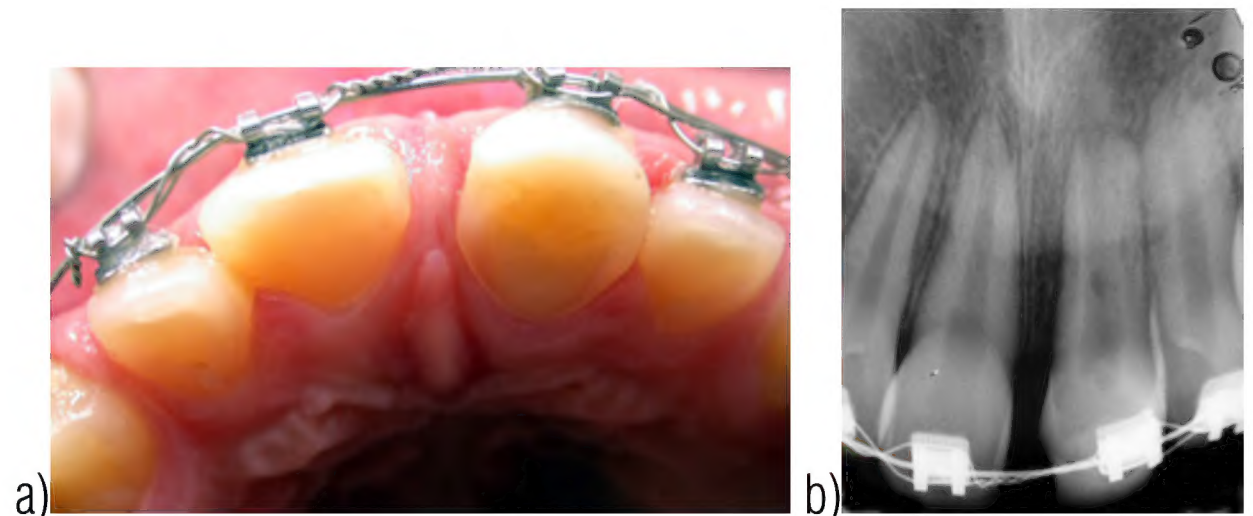
■ **Figure 5** – a) Immediate postoperative; b) periapical radiographic.

At one week follow-up the patient was in excellent condition with neither symptoms nor signal of any problem. After two months, the clinical examination showed a satisfactory aesthetics and the periapical radiograph revealed the continue root development (Fig. 6).



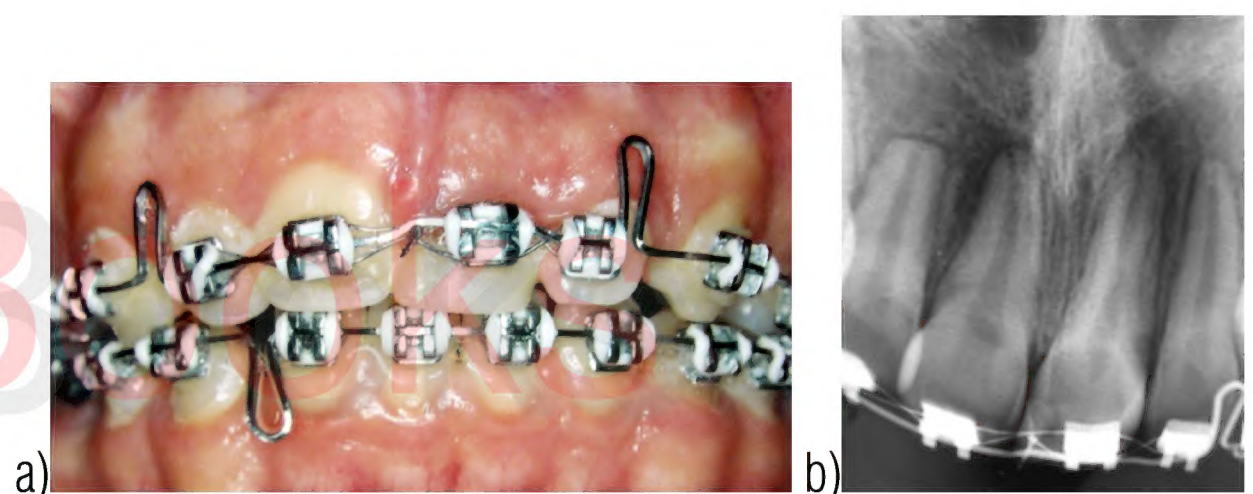
■ **Figure 6** – a) Two months follow-up; b) periapical radiograph.

At six months follow-up, the tooth was found in normal function and showing normal root development at the intraoral radiograph, even being undergone to the orthodontic treatment (Fig. 7).



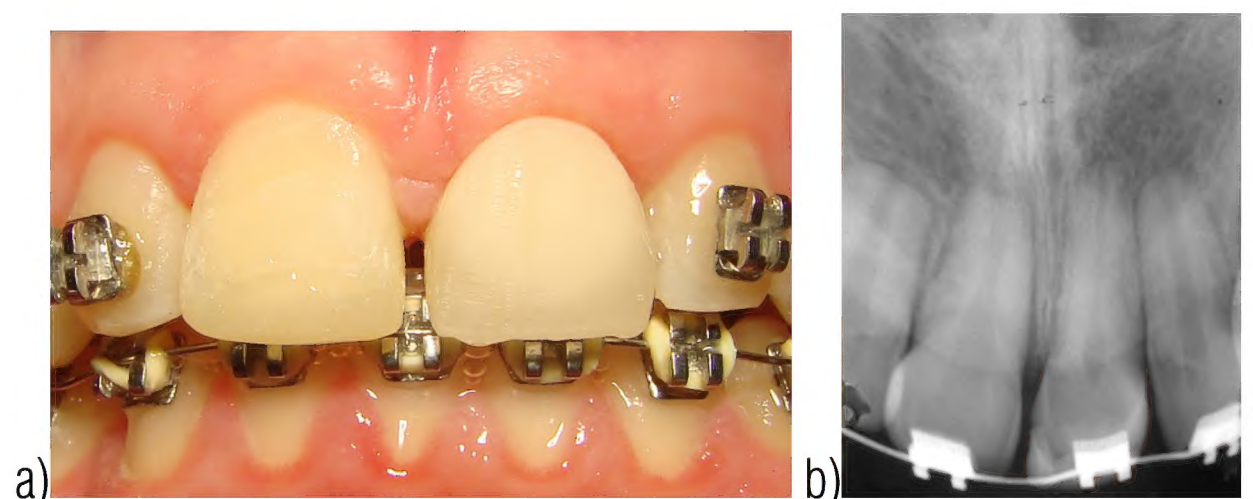
■ **Figure 7** – a) Six months follow-up; b) periapical radiograph.

The patient has not answered the recalls for two years. At that time he came in bad oral hygiene condition, however there was no signal of failure. The pulp test revealed a positive response. The intraoral radiograph showed radiolucent area around the central incisors root and apical resorption from the #12 tooth probably due to orthodontic movement (Fig. 8).



■ **Figure 8** – a) Two years follow-up; b) periapical radiograph.

Since the patient had returned to the clinical treatment to restore the tooth, the oral hygiene control has been reestablished. Although the orthodontic treatment has not finished yet, a temporary crown was performed because the patient was not satisfied with the aesthetic anymore. Thus, the tooth and the gingival tissue around were found healthy with no evidence of necrosis or any pocket formation and the intraoral radiograph showed normal periapical area at 5 years follow-up (Fig. 9).



■ **Figure 9** – a) Five years follow-up; b) periapical radiograph.

DISCUSSION

Autotransplant method has an optimum indication for a 10-year-old child because alveolar growth is not yet complete contraindicating implants or fixed prosthetics. Furthermore, the transplant establishes a functional tooth unit which allows the development of alveolar bone [1, 15].

Root length plays a major role in a transplant success. Although the literature review showed successful cases report about transplant of teeth with completely developed roots [10, 11, 14], the best donors are teeth with immature root development with wide open apex that provide a good prognosis with respect to pulpal healing [1, 4]. Consolaro et al. (2008) clearly demonstrated that the immature periodontal tissues adhered around developing roots are extremely susceptible to vascular, neural and other tissues reconnection, due to a lot of ions, aminoacids and various cellular mediators that are responsible for nutrition and stimulation of proliferative and repair actions.

Despite many studies have emphasized transplants of third molars to substitute first molars prematurely lost [8, 12, 13], premolars are also excellent donors to the anterior region and have been used, generally in case of trauma, providing aesthetic improvement in this area [1, 6, 9]. For the same purpose, intentional replantation follows the same rules in order to allow appropriate restoration of a tooth that suffered invasion of biological width [2].

Authors agree that the surgical plan must consider an atraumatic technique as removing the compromised tooth preserving the socket integrity as extracting the transplant avoiding periodontal ligament (PDL) damage [1, 12, 14]. This concept was totally applied here. Moreover, the #45 tooth extra-alveolar time was the minimum necessary to be replaced, improving chances of pulpal revascularization and PDL reinsertion [4, 5]. In this case, even the #21 tooth root has fractured two months earlier there was no pathology at this site.

Autotransplants can be planned with orthodontic treatment in safety. The response of transplanted teeth to the orthodontic movement should be the same of the other teeth, if the principles discussed have been considered [5, 7].

Initially the transplanted premolar was reshaped to incisor morphology reducing the palatal surface avoiding occlusal forces to prevent resorption [11], but five years later a temporary crown was performed awaiting the orthodontic treatment ending. Inter-disciplinary planning is important for successful aesthetic results [6].

Clinical and radiographic examination after five years follow-up of the described case confirmed the achievement of success under the following parameters: mobility, pocket depth, pulpal status, clinical symptoms, root development, periodontal ligament space and function and aesthetics reestablishment.

CONCLUSION

Autogenous transplantation is a viable procedure with low morbidity. The immediate replacement of a lost or compromised tooth usually ensures good functional and aesthetic outcomes. The correct indication and the careful surgical technique certainly were responsible for the excellent result of the case reported.

REFERENCES

- [1] Andreasen JO, Andersson L & Tsukiboshi M. 2007. Autotransplantation of teeth to anterior region. In: Andreasen JO, Andersson L & Andreasen FM. Textbook and color atlas of traumatic injuries to the teeth. Wiley-Blackwell, 740–59.
- [2] Bittencourt GS, Almeida FX & Roldi A. 2009. Intentional replantation with tooth rotation as indication for treatment of crown-root fractures. *Revista da SBTD* [on line] 2009 [cited 2009 Mai 25]; 1(1): 2–6. Available from: <http://www.sbtbd.org.br>.
- [3] Burkhardt AJ, Caballero RFV, Fernández FP, De la Torre T & Idáñez MT. 2004. Tratamiento quirúrgico de las malposiciones dentales. *Rev Esp Cirug Oral y Maxilofac*, 26: 168–177.
- [4] Clokie CML, Yau DM & Chano L. 2001. Autogenous tooth transplantation: an alternative to dental implant placement? *J Can Dent Assoc*, 67: 92–6.
- [5] Consolaro A, Pinheiro TN, Intra JBG & Roldi A. 2008. Transplantes dentários autógenos: uma solução para casos ortodônticos e uma casuística brasileira. *Rev. Dent. Press Ortodon. Ortop. Facial* [on line] 2008 [cited 2009 Mai 25] 13: 23–8. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-54192008000200003&lng=en.
- [6] Czochrowska EM, Stenvik A & Zachrisson BU. 2002. The esthetic outcome of autotransplanted premolars replacing maxillary incisors. *Dent Traumatol*, 18(5): 237–45.
- [7] Figueira LH, Costa RT, Menezes Filho JR & Marzola C. 2007. Transplantes dentários em Ortodontia. *SPO – Especialidade Odontológica* [on line] 2007 [cited 2009 Feb 2]. Available from: http://www.spo.org.br/det_texto_odonto.php?id_texto_odonto=562.
- [8] Lima Jr JL, Góes KKH, Ribeiro ED & Marzola C. 2005. Duplo transplante autógeno de terceiros molar superior e inferior para alvéolos de segundo e primeiro molares inferiores – relato de caso clínico cirúrgico. *Revista ATO*, 5(6): 576–88.
- [9] Marzolla C, Lago-Rocha LC, König Jr B, Geromel ROF, Mauro LDL & Toledo-Filho JL. 2008. Premolar germs transplantation for the traumatized incisor alveoli – retrospective study. *Revista ATO* [on line] 2008 [cited 2009 Mai 15]. Available from: http://www.actiradentes.com.br/revista/2008/textos/4RevistaATO-Premolar_transplantation-2008.pdf.
- [10] Pagliarin FO & Benato M. 2006. Transplante dentário autógeno: apresentação de dois casos. *Clin Pesq Odontol*, 2(3): 231–240.

- [11] Pires MSM, Giorgis RS, Castro AGB, Beltrame J & Saueressing F. 2002. Transplante autógeno de germe de terceiro molar inferior com rizogênese completa para alvéolo de primeiro molar inferior. BCI, 34: 157–163.
- [12] Rosenscheg SW, Marzola C & Toledo-Filho JL. 2007. Transplantes autógenos de germes de terceiros molares inferiores para os alvéolos de primeiros molares inferiores revista da literatura e apresentação de caso clínico cirúrgico. Rev ATO, 7(7): 514–33.
- [13] Sebben G, Castilhos MDS & Silva RFC. 2004. Transplantes autógenos de terceiro molares inclusos. Rev ADPPUCRS, 5: 109–11.
- [14] Sunil KC, Mohan B & Lakshiminarayanan L. 2001. Autogenous tooth transplantation – two clinical cases. Endodontology, 13: 51–6.
- [15] Toledo-Filho JL, Longo-Filho JS & Marzolla C. 2009. Incisive transplantation – a retrospective study. Revista ATO [on line] 2009 [cited 2009 Mai 15]. Available from: <http://www.actiradentes.com.br/revista/2009/textos/11RevistaATO-Incisive_transplantation-2009.pdf>.

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